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The results herein detailed are those of an examination of the leucocytes in 27 cases of scarlet fever. 60 enumerations of the white cells and 28 differential counts were attempted. In ~~eleven~~ cases the white cells were counted four times, once, approximately, during each of the first four weeks of disease. In each of fifteen other cases an enumeration was made in the first week of disease - in one other case on the 9th day of disease.

Technique:- Gowers' was the leucocyte counter selected and a pipette giving a dilution of 1:10 was used. The diluting fluid was 1% sol of acetic acid stained with methyl violet. This effectually dissolved the erythrocytes and distinctly identified the leucocytes by staining their nuclei. The enumerations are based on a count of the contents of 50 of the ruled squares on the Gowers slide. The differential counts were made from films stained with Leucocyte Stain, and in the majority of cases the %'s were based on a classification of 500 leucocytes. A  $\frac{1}{12}$ " oil immersion lens was used for the differential enumerations.

Count of Leucocytes <sup>and Count of Leucocytes</sup>:- No count was made in any case before the 2nd day of disease. In the two cases examined on the 2nd day of disease one showed a definite leucocytosis viz 14,500 white cells per Cub. mm. which was relative as well as absolute. The other case gave the lowest recorded count viz 5,100 per Cub. mm. but there was a relative polymorphonuclear <sup>neutrophilic</sup> leucocytosis viz 97.2% of 500 White Components classified. The results of the five counts made on the 3rd day of disease, taking 7,500 leucocytes per Cub. mm. as the mean normal average, showed leucocytosis definitely established, the highest count being 22,100, the lowest 10,500 per Cub. mm. In the series of Eleven Cases, in each of which 4 counts were made, leucocytosis was present in 8 of the first counts, 7 of these being made in the 1st week, one three days later viz in the 1st half of the 5th week of the remaining 3 of the Eleven Cases, 2 showed

leucocytes in the 3<sup>rd</sup> week and one in the 2<sup>nd</sup> week. It will thus be noted that the increase in leucocytes is maintained over a considerable period viz in 72.7% of the cases quoted where the increase was continued into the 4<sup>th</sup> week (including the case counted in the 1<sup>st</sup> half of the 5<sup>th</sup> week).

In Case Mrs James, of the group of eleven cases, no definite leucocytes were found on 6<sup>th</sup> day of disease, but 17,600 white cells were counted on 14<sup>th</sup> day. Again in Case George Moore of the same series leucocytes were first noted in the count of the 9<sup>th</sup> day of disease, and in the case Mary Marshall of the same series leucocytes were not recorded until the 4<sup>th</sup> week of disease viz 23<sup>rd</sup> day. Of the same series case A. Under, on the 4<sup>th</sup> day of disease showed only 8,200, but on 10<sup>th</sup> day 11,800 leucocytes were counted.

Highest leucocytes:- The highest leucocytes discovered was 32,600 per cub. m. water in the case of Albert Hart and the count was made on the 6<sup>th</sup> day of disease. On 13<sup>th</sup> day it had fallen to 23,800, on 20<sup>th</sup> to 16,600 and on 26<sup>th</sup> day to 13,300 per cub. m. water. No further count was made in this case. It will be seen that the enumerations recorded a progressively diminishing number. The case was not characterized by unusually high temp. at least not in hospital - the highest recorded being 102.6° at 6 p.m. on 12<sup>th</sup> Apr. the day of admission and 2<sup>nd</sup> day of disease. It was normal at 10 a.m. on 14<sup>th</sup> Apr. remaining so until 16<sup>th</sup> Apr. when it reached 100.4° at 6 a.m. On 17<sup>th</sup> Apr. it was normal at 6 a.m., and remained so with the exception of a slight rise on 20<sup>th</sup> inst. The rash was bright scarlet and there was some soft deposit on the right tonsil associated with glandular enlargement, not very pronounced. There was right otitis. At the time of making the first enumeration some Impetigo of the face was noted. The next highest count 32,500 per cub. m. water was made in case Eliza Moore on 7<sup>th</sup> day of disease. No unusually high temperature ruled in hospital. 102° was the highest recorded - at 10 p.m. on 19<sup>th</sup> Apr. the



day of admission and 3<sup>d</sup> day of disease. It then settled between  $101^{\circ}$  and  $99^{\circ}$  until 23<sup>rd</sup> apt when it fell to normal. The rash - generalized scarlet & punctate - was well marked associated with tonsillar enlargement & free secretion, rhinorrhoea and slight bilateral swelling of submaxillary glands. On 27<sup>th</sup> apt - 18<sup>th</sup> day of disease Herpes labialis was noted.

In Case Dr. H. Hughes 28,900 leucocytes per cubic cm. were counted on 4<sup>th</sup> day of disease. The highest temperature recorded in hospital was  $101.4^{\circ}$  at 6 p.m. on 21<sup>st</sup> apt. The day of admission and 3<sup>d</sup> day of disease. Some oscillations followed. Normal was reached at 6 a.m. on 23<sup>rd</sup> apt - 5<sup>th</sup> day of disease. There was slight bilateral swelling of submaxillary glands and some deposit on both tonsils. The rash - generalized scarlet & punctiform. On 26<sup>th</sup> day a small abscess developed on left buttock. On 27<sup>th</sup> day there was some epistaxis.

In Case Dr. P. Jamieson 28,600 leucocytes were counted on 4<sup>th</sup> day of disease. On admission Temp. recorded  $101^{\circ}$ . Then followed remissions of about a degree (four hourly temps) until 6 p.m. on 24<sup>th</sup> apt when  $102.8^{\circ}$  was recorded. Then followed a remittent temperature  $101.2^{\circ}$  -  $99.8^{\circ}$ . Normal was reached at 2 a.m. on 2<sup>nd</sup> May the 13<sup>th</sup> day of disease. At 10 a.m. on the same day  $99.8^{\circ}$  was reached. The temperature thereafter was practically normal tending towards subnormal records. The rash was scarlet punctiform and noted on trunk and thighs. There was slight bilateral submaxillary glandular enlargement. On 25<sup>th</sup> apt pharyngitis occurred in the fingers, subsequently extending to wrists arms and shoulders. This no doubt would account for prolonged pyrexia. On May 1<sup>st</sup> there was a slight roughness of quality about the P.T. cardiac sounds. On 4<sup>th</sup> May, a sound simulating friction was detected at left sternal margin on level with nipple but not sufficient characteristic to warrant any definite diagnosis.

It may be noted in the first three cases viz. Albert Hall, Eliza Moore & Frank Hughes that there was during the progress of the illness some manifestations of peripheral suppuration viz. Impetigo, Herpes labialis and a small

abscess on left buttock in the three cases respectively. In each of the preceding four cases there was some glandular enlargement.

Table of Highest Leucocyte Cases

	Day of Dis	Count	Gland. Enlargement	Occurring in Disease
Ala. Hart	6	32.600	Yes	Septicæmia
Eliza Moore	7	32.500	Yes	Septicæmia
Frank Hughes	4	28.900	Yes	Abcess L. Buttock
W. T. Farnum	4	28.600	Yes	Rheumatism

Lowest Leucocyte Counts:-

The lowest leucocyte counts were

	Day of Disease	Count
Geo. Moore	2	5.100
Amey Mackell	7	6.900
E. Darnes	6	7.700
A. Rudes	4	8.200

In each of the above cases, however, a definite leucocytosis was recorded on subsequent examinations of the blood. Although the counts in cases Geo. Moore and Amey Mackell are low they scarcely come under the definition of distinct leucopenia. Once only, in a series of four counts, was leucocytosis detected in the case Amey Mackell and <sup>that</sup> on 23<sup>rd</sup> day of disease <sup>with 8000 being recorded</sup>. A count on 8<sup>th</sup> day <sup>had given</sup> 8.000 leucocytes per cubic mil. - <sup>with 8000 being recorded</sup>. On 26<sup>th</sup> day the enumeration was 6.800. On questioning patient - a female aged 23 years - she asserted on 23<sup>rd</sup> day that she had formerly suffered from anemia, but her appearance in hospital was not suggestive of it. An enumeration of the red blood corpuscles which were of good shape gave the large total of 605.000 per Cub. mil. - while

5.  
The haematocrit showed 70%. The estimation of haemoglobin and enumeration of erythrocytes were made on 26<sup>th</sup> day of disease when the leucocytes numbered 16,800 per Cub. mil. wet. prep. Hungry, he indicated that she fainted twice on 3<sup>rd</sup> June - 42<sup>nd</sup> day of disease - but on 4<sup>th</sup> June appeared well. Auscultation revealed nothing abnormal in the cardiac sounds. Mucous secretion was regular. No repetition of fainting followed.

Comparison with the mean normal average of 7,500 leucocytes per Cub. mil. wet. prep.

The number of leucocytes per Cub. mil. wet. prep. in 17 counts in 17 cases made sometime during the first week gave an average of 17,941 per count. In a series of eleven cases in each of which 4 counts were made the highest average leucocytosis was found in the 1<sup>st</sup> and 2<sup>nd</sup> weeks viz 14,318 and 15,218 respectively. In the 3<sup>rd</sup> week the average was 14,045. In the 4<sup>th</sup> week, 10 cases 11,650 or including the case counted on 31<sup>st</sup> day 11,545. In the first week the extremes were recorded, viz 32,600 and 5,100 <sup>and the count was made by irregularity</sup>. In the 2<sup>nd</sup> week there was only one case giving a count of less than 10,700 per Cub. mil. wet. prep. There was some uniformity in decline of leucocytosis observed in three of these eleven cases viz Albert Hart, Willie D. Sagrott & Rose Barger. As before stated the final count in these eleven cases was made in the 4<sup>th</sup> week of disease, except in one case, when the count was taken in the 1<sup>st</sup> half of the 5<sup>th</sup> week. Including the latter in the fourth week counts it was found that leucocytosis was present in 72.7% of the cases at a comparatively late period in the disease viz the 4<sup>th</sup> week; no later observations were made.

Out of the 60 enumerations made in 27 cases (including the 44 counts in 11 cases) only were below 10,000 per C. mil. wet. 3 of them in one case, and in all of the 27 cases investigated a leucocytosis <sup>was present</sup> on some day of examination.



In reviewing the above results it will be seen that the figures show a distinct and in the majority of cases a prolonged leucocytosis in scarlet fever.

Classification of Leucocytes in healthy adult blood (Dufek)

Small lymphocytes	20-30%
Large lymphocytes & transitional forms	4-8%
Polymorphonuclear neutrophils	60-75%
Eosinophiles	.5-5%
Basophiles	.5%

### Differential Counts:-

28 Differential Counts were attempted from cover slip films fixed and stained in Jenner's stain. These were obtained from 20 Cases.

Polymorphonuclear <sup>neutrophils</sup> Leucocytes:- These were markedly increased. In each of 19 preparations from 16 Cases a count of over 90% was taken on different days of disease. In 17 Cases films counted during the first week gave an average of 92.5%. Only one count was less than 83.2% viz 73% on 15th day in Case Amyellins. A count however in this Case made from a film taken on 17th day showed 91.4% of polymorphonuclear neutrophils. In 7 Cases 2 differential counts were attempted one early and one in the 3rd or 4th week of disease. In four of these cases fewer polymorphonuclear ~~leucocytes~~ neutrophils were recorded in the 2nd count viz:- one falling from 98.4% to 79.3% another 97.2% to 88% and two showed only a slight fall. Three showed an increase of polymorphonuclear neutrophils on the 2nd count viz:- two a very slight increase - it is noteworthy however that in one of these where the count had gone up from 94% to 98.6% that on the day preceding that on which the film was taken Cervical adenitis fairly well marked had occurred with elevation of temperature to 102°. The remaining case of the three in which a marked increase occurred, showed a rise from 73% to 91.4%. There was nothing detected clinically to account for it.



Eosinophiles:— These were found in all of the 28 preparations examined, the counts varying from .6 - 15.8 %. Only two however exceeded 6.2%, viz one 18.8% the other 15.8%. In 17 preparations from the same number of cases taken during the first week the average was 3.8%. The case Cecilia Ruth Scumple in which 15.8% occurred showed nothing unusual clinically except this%. There was some left cervical adenitis noticed on 17<sup>th</sup> day of disease - the count was from a film taken on 3<sup>rd</sup> day. The case Wymollins which showed 8.8% of Eosinophiles on 5<sup>th</sup> day was an uncomplicated one. It showed a marked increase of polymorphonuclear neutrophils in the 3<sup>rd</sup> week when the Eosinophiles fell to 4.4%.

Small Lymphocytes:—

In four of the 20 cases in which differential counts were attempted no small lymphocytes were seen. Of the remaining 16 the case W. Bosterman gave the highest % viz 10%. There was nothing of unusual clinical interest in this case. In the case Leslie Egan 6.8% of small lymphocytes were estimated on 10<sup>th</sup> day whereas on a preceding day - the 5<sup>th</sup> - none were counted. On the 19<sup>th</sup> day 1.3% was the record. The fall from the 10<sup>th</sup> to the 19<sup>th</sup> day was associated with an increase in polymorphonuclear neutrophils and left cervical adenitis and some temporary pyrexia (102°). In three of the 16 cases in which small lymphocytes occurred the % was as low as .2%. In one of these three cases viz Wymollins the count of .2% was made on 17<sup>th</sup> day. A count on 5<sup>th</sup> day had shown 7.8% of small lymphocytes. The fall was associated with an increase in polymorphonuclear neutrophils and a fall in Eosinophiles <sup>the transitional forms</sup> and large lymphocytes <sup>of small lymphocytes</sup>. The average in 17 films from as many cases taken during the 1<sup>st</sup> week showed 11.4%.

### Large Lymphocytes :-

In 3 of films from 20 cases no large lymphocytes were seen. The highest % was 5.4% ~~from~~ in a count from a film taken on the 5th day of disease. On 17th day .6% was the record, associated with increase in polymorphonuclear neutrophils and diminution in Eosinophils and small lymphocytes. In the 17 cases showing large lymphocytes .2% was the lowest %. An average of 17 counts in as many cases taken during the 1st week showed 1.14%.

### Transitional Leucocytes :-

In this class are included cells which it was found <sup>very</sup> difficult to classify. Some were apparently morphologically large & small lymphocytes but gave out a feeble basic reaction to Jenner's stain. Others looked like large mononuclear leucocytes with no protoplasmic granulation, in some there was possibly some slight fine granulation of the protoplasm. In one only of the 20 cases examined was there a high % viz 13.3% on 22nd day of disease in the case I. H. Galt. A previous count on 2nd day showed .6%. The % of 13.3 was associated with a marked fall in the polymorphonuclear neutrophils and the appearance of small and large lymphocytes. Has stated occurred on 22nd day of disease. In 6 of the 20 cases examined it was not found necessary to include any cells in this class. Of the remaining 14 cases excluding the 13.3% count the highest % was 6.6 associated with a moderate fall in polymorphonuclear neutrophils. The lowest % of the 14 cases was .2%. In 17 films from the same number of cases taken during the first week the average was .6%.

Eosinophilic Leucocytes :- In the case Annie Barnes a cell presenting the characters of an eosinophilic leucocyte was noted in a differential count of 500 leucocytes.

Comparison with the %'s of the various Leucocytes in normal blood.

From the preceding details it will be seen that a marked change in the numerical relationship of the various Leucocytes occurred viz. The average polymorphonuclear neutrophils in 17 cases from films taken during the first week showed 92.5% against 60-75%. This was associated with marked diminution in Small lymphocytes viz an average of 1.4% in 17 Cases from films taken during the first week as against 20-30%. Grouping the Large lymphocytes & Transitional forms together for purposes of comparison an average of 2.1% is shown in the 17 Cases previously quoted as against 4-8%. The Eosinophiles were present in very countable and showed 3.8% in the 17 Cases under discussion as against .5-5%. It must be remembered however that one count was conspicuously high viz:- 15.8%.

Leucocytosis in relation to the severity of the disease.

An attempt was made to classify the cases into those of mild or less severe and those of wild type - 13 were placed in the first group, 14 in the second. The highest Leucocyte count taken at any time in each case gave the following results:

Group I <u>Mild or less severe cases</u>	Leucocytes per C. m. m.	Group II <u>In wild case</u>	
4 Cases showed	28.600-32.600	1 Case showed	27.400
2 . . .	22.000-22.900	3 Cases . . .	19.100-19.800
4 . . .	16.200-18.800	6 . . .	16.000-18.700
3 . . .	10.500-14.300	4 . . .	11.500-13.600

Average Leucocytes per C. m. m. in the 13 Cases Group I 21.092  
 . . . . . 14 . . . Group II 17.142

From this it will be seen that certain isolated cases of the severer type gave relatively high counts and that the average in this class was approximately 4.000 above the average in the milder type of group II. It will be noted however that one case in this latter class showed a relatively high count.

A further calculation based on the counts



(One count made on 9<sup>th</sup> day)

of the first week, showed:-

Group I. In more or less severe Cases.

Leucocytes per C. m. m.

4 Cases 28.600 - 32.600

1 Case 22.000

4 Cases 16.200 - 18.800

4 Cases 10.500 - 15.300

Group II In mild Cases

1 Case 27.400

4 Cases 17.200 - 19.100

3 Cases 13.200 - 16.000

2 Cases 10.600 - 12.400

4 Cases 5.100 - 8.200

Average leucocytes per C. m. m. in the 13 Cases, Group I 20.507

Group II 14.007

i.e. an average of 6.500 leucocytes more per count in the more or less severe group. viz higher figures than in the preceding calculation, and certainly more reliable.

Leucocytes and Sex:- Of the 27 Cases examined 21 were 10 yrs of age and under, and 6 were over 10 and under 24 years of age. Of 21 Cases - 10 years of age and under - 12 were female and 9 male Cases. Counts made in the first week (one 9<sup>th</sup> day James Lamb at 9) gave the following averages:-

Females 19.208.3 per C. m. m.

Males 17.522.2

i.e. 1.686.1 less leucocytes in the male case average. Highest leucocyte counts at any time gave the following averages:-

Males 20.600 per C. m. m.

Females 19.208.3

i.e. 1.391.7 less leucocytes in the female case average. In the two comparisons the order of difference is reversed and the difference is slight in either case. Of the 6 cases - over 10 years of age and under 24, three were males and three females and gave the following averages:-

Leucocytes per C. m. m.:-

1<sup>st</sup> week

Highest count at any time

Males 11.633.3

17.933.3

Females 13.200.0

14.833.3

i.e. the female average 1.566.7 in excess in the 1<sup>st</sup> week. The male average in excess in the highest counts at any time. In these statistics the calculation based on the highest count at any time is obviously the less reliable. Hence adhering to the 1<sup>st</sup> week average it is seen that the female average is higher in the two classes of cases viz 1.686.1 and 1.566.7 respectively. The excess however, is so small that sex, in these cases, does not appear to be a determining factor in the degree of leucocytosis.

X. Kent based



## Leucocytes and Age:-

The cases were scarcely suitable for a determination of the relations between leucocytes and age but in so far as possible such a determination was attempted.

Of the 27 cases examined, 15 were female cases. Of these 15 cases seven were <sup>cases</sup> not over 5 years of age in which the average count per cub. m-metre, taking the highest count at any time, was 20.585.7.

The remaining eight cases (of the 15 female) over 5 years of age showed an average of 16.362.5 per c. m-metre, i.e. 4.223.2 leucocytes <sup>per cent</sup> less, per cub. m-metre, than the former cases.

Of the 27 cases examined 12 were male cases, five of them under 8 years of age in which the average was 23.100 per cub m-metre. The remaining seven cases (of the 12 male) 8 years & over, gave an average of 17.671.4, viz 5.428.6 leucocytes <sup>per cent</sup> less, per cub m-metre, than in the former cases under 8 years of age.

Another calculation, <sup>average reliable one</sup> based on the counts of the first week (one exception 9th day viz. 1st Carter at 9) gave the following figures:-

### 15 Female cases:-

7 not over 5 years of age	average per c. m. m.	20.585.7
8 over		15.750.0
i.e. 4.835.7 less leucocytes <sup>per cent</sup> in the cases over 5 years of age		

### 12 Male Cases:-

5 under 8 years of age	average per c. m. m.	19.400
7 over		13.657.1
i.e. 5.742.9 less leucocytes <sup>per cent</sup> in the cases over 8 years of age		

From the above statistics there would appear to be a greater leucocytic response to the incidence of the scarlatinal virus, in the earlier years of life.

## Leucocytes in relation to Temperature:-

There did not appear to be any definite relation between Temperature and the degree of leucocytosis. The Count of 32,600. Albert Hunt - was made during a period of slight pyrexia. The Count 32,500. Elyse Meade - was made on the 7th day of disease, the Temperature had been remittent from 3rd - 6th day, ranging from  $102-99^{\circ}$  but gave a normal record from 7th day on. The Count 28,600. M. V. Dammis - was made on 4th day of disease, that of admission to hospital when the Temperature recorded  $101^{\circ}$  at 2 p.m. Intermittences of about a degree followed till 6 p.m. on 5th day of disease when  $102.8^{\circ}$  was recorded, an oscillating Temperature followed and normal was reached on 13th day. In the case Grace E. Long  $103^{\circ}$  indicated the Temperature on admission, the 3rd day of disease, a count made at that date showed leucocytes 18,000 per Cub. m. unite.

In the case A. Barnes the Temperature was  $99.4$  at 2 p.m. on the day of admission, the 4th day of disease. At 6 p.m. it was  $100.2^{\circ}$  at 10 a.m. next day - the 5th of disease - it fell to  $97.6^{\circ}$  and no pyrexia followed. A count at 2.30 p.m. on 5th day showed 27,400 leucocytes per Cub. m. unite.

Ethel Hunt admitted 2nd day - the 2nd day of disease, had a Temperature of  $101^{\circ}$  at 2 p.m. on admission, which rose to  $102^{\circ}$  at 10 p.m. A remittent Temperature was exhibited up to 18th day of disease, the highest record being  $103.8^{\circ}$  on 14th day. On 20th day  $102.6^{\circ}$  was recorded. The Temperature then gradually fell, oscillating the while, until normal was reached on 26th day of disease and remained practically so to 38th day of disease. A count taken at 7th day which occurred during the febrile period showed 16,200 leucocytes per cubic unit - unite. Case Rose Bayley admitted 2nd day of disease had a Temperature of  $103^{\circ}$  at 6 p.m. on that day. It fell gradually to normal on 5th day and remained so. A count on 3rd day of disease showed leucocytes 18,800 per cubic unit - unite. Case Leslie Egan admitted 3rd day of disease exhibited practically

11.  
a normal temperature prior to first count on 5<sup>th</sup> day when the leucocytes numbered 19,100 per cub. m. m. m.

Case Wm. Collins exhibited no febrile temperature after admission on 3<sup>rd</sup> day of disease. On 5<sup>th</sup> day of disease the leucocytes numbered 10,600. On 11<sup>th</sup> day 19,800 per cub. m. m. m. viz an increase in a period of apyrexia.

Case George Moore admitted 2<sup>nd</sup> day of disease showed a temperature of 100.2° at 2 p.m. on admission. At 6 p.m. 102.4°. Normal was recorded at 10 a.m. on 5<sup>th</sup> day of disease. Slight pyrexia followed and normal was finally reached on 7<sup>th</sup> day of disease. A count on 2<sup>nd</sup> day showed 15,100 leucocytes. On 9<sup>th</sup> day after 2 days apyrexia 10,700. On 18<sup>th</sup> day after 11 days apyrexia 13,600 per cub. m. m. m.

Case Kathleen Goodman was admitted on 2<sup>nd</sup> day of disease. A high temperature ruled necessitating frequent sponging. A count on 3<sup>rd</sup> day showed 22,000 leucocytes per. Cub. m. m. m. It was a orphic case going on to a fatal issue.

It would be possible to add to these details showing irregularity in relation between temperature and leucocytosis, making it yet more difficult to establish any definite ratio between the degree of leucocytosis and the pyretic records.

## Major Conclusions from an examination of the leucocytes in Rickettsia

1. A distinct leucocytosis (in all cases examined)
2. A prolonged leucocytosis in the majority of cases
3. Of the first four weeks leucocytosis is highest in the 2<sup>nd</sup> week of disease.
4. A marked increase in the polymorphonuclear neutrophils
5. A marked diminution in the small lymphocytes, in some cases their entire disappearance.
6. A diminution in the large lymphocyte and transitional forms.
7. The persistence, in all cases examined, of the eosinophiles with a comparatively unaltered numerical relation to the whole number of leucocytes.
8. A somewhat greater degree of leucocytosis in the severe forms of the disease examined.
9. No definite relation between the degree of pyrexia and that of leucocytosis.
10. The highest leucocytosis occurs in those cases which at some period of the disease exhibit a peripheral suppurative process.
- \* 11. The fall in leucocytosis is not marked by general definite regularity though some <sup>cases</sup> show such a decline.
- \* To count beyond 4<sup>th</sup> and in one case 5<sup>th</sup> week.
12. Sex has little if any influence on the degree of leucocytosis. If there be any excess it is in female cases.
13. There appears to be a greater leucocytic response to the scrub typhus virus in the earlier years of life.



NOTE:-

It may be remarked, incidentally, that in making the differential counts in cases Leslie Egan and Nellie D. Sagrott - the former on the 10<sup>th</sup> the latter on the 23<sup>rd</sup> day of disease - non-granular bodies approximately about  $\frac{1}{10}$ <sup>th</sup> the size of a red blood corpuscle were seen, staining blue (Gruner's stain) the periphery darkly, the main body faintly. In the former case - Leslie Egan - there were 17 of these bodies tending to group together, some oval, some round others irregularly round in shape. In the latter case - Nellie D. Sagrott - there were only two of these bodies both of irregular form. No nucleus was detected <sup>in these bodies</sup> in either of the two cases.

The Cases under Examination :-

The 27 Cases, in which <sup>the 60</sup> enumerations and 28 differential counts were made were clinically cases of scarlet fever. While not by any means basing the diagnosis on designation alone, it may be stated that it occurred in every case. On the next pages following, an abbreviated history of each case is appended. No notes of the cases were made after 7<sup>th</sup> June the writer leaving the Brook Street Hospital of the Antiop. Acylume Board for their Roughneck Small Pox Hospital on the 8<sup>th</sup> June 1903. Prior to 7<sup>th</sup> June the only fatal case was that of Kathleen Goodwin. Unfortunately the films taken from this case were not satisfactory and no differential count was made.

(Oct 7/12)  
Wes Turner:- Admitted 11<sup>th</sup> apt (1<sup>st</sup> day of disease (?))  
Rash greenish, bright, punctate. Favus injected.  
Glands enlarged. Tongue coated. 18<sup>th</sup> apt back  
 peeling. Temp. Anaximinis 11<sup>th</sup> apt at 10 p.m.  
 101°. Slight remission. 12<sup>th</sup> apt 101° at 6 p.m.  
 13<sup>th</sup> apt normal at 10 a.m. 100° at 6 p.m. 14<sup>th</sup> apt  
 normal at 6 a.m.

(Oct 6/12)  
Albert Hart:- Admitted 12<sup>th</sup> apt (2<sup>nd</sup> day of disease)  
Rash bright scarlet. Favus & Palate injected.  
Right Tonsil. patch of soft deposit. Tongue coated.  
Glands enlarged. Right Ovaries 16<sup>th</sup> apt face  
 peeling. Temp. Anaximinis 2 p.m. 12<sup>th</sup> apt  
 102° at 6 p.m. 102.6° 13<sup>th</sup> apt 10 a.m. 99°,  
 6 p.m. 100.8°. 14<sup>th</sup> apt 99.8° 6 a.m., normal  
 at 10 a.m. remained so until 16<sup>th</sup> apt when 100°  
 at 2 a.m., 100.4° 6 a.m. practically same till 6 p.m.  
 Fell to normal on 17<sup>th</sup> apt at 6 a.m. Normal  
 thereafter except at 6 p.m. on 20<sup>th</sup> apt.

<sup>(ad 13)</sup>  
Helie D. Sagrott:- admitted 22<sup>nd</sup> apt (2<sup>nd</sup> day of disease)  
 Rash. Generalized scarlet punctate. Tongue Red, papillae  
 prominent. Throat Normal 29<sup>th</sup> apt Ears, face &  
 Chest desquamating. Temperature. On admission  
 22<sup>nd</sup> apt at 10 p.m. 100°. Normal next day at 6 a.m.  
 continued so.

<sup>(ad 15 1/2)</sup>  
Joe McFarthy:- admitted 23<sup>rd</sup> apt (2<sup>nd</sup> day of disease)  
 Rash Erythematous slight punctations on trunk.  
Tongue Coated. Fauces injected Tonsils slight deposit  
 on both. Submaxillary Glands. slight bilateral swelling.  
 apt 24<sup>th</sup> Face peeling. Temperature On admission  
 23<sup>rd</sup> apt at 10 a.m. 98° (Bath?). 102° at 6 p.m. Some  
 limp. recorded up to 25<sup>th</sup> apt with slight remissions.  
 Crisis, reaching normal on 28<sup>th</sup> apt at 6 a.m.  
 Thereafter normal

<sup>(ad 14)</sup>  
Fred. Saker:- admitted 23<sup>rd</sup> apt (3<sup>rd</sup> day of disease)  
 Rash generalized scarlet punctate. Tongue Clean  
Fauces slightly injected. Submaxillary Glands- bilateral  
 enlargement. 25<sup>th</sup> apt Pain in left ankle  
 May 12<sup>th</sup> Pain in Cordis region, hard blowing systolic murmurs  
 May 14<sup>th</sup> Presystolic Thrill & presystolic mitral murmurs, pain in

Proctor (continued) :- Canine region. May 19. No pain.  
 May 22nd Feet desquamating. June 5th Some  
 lachrymation of feet. Temperature On admission 23<sup>rd</sup> apt  
 at 6 p.m. 101.2°. 24<sup>th</sup> apt 10 a.m. 99°. at 2,  
 6 & 10 p.m. 100°. 25<sup>th</sup> apt 2 a.m. 98°. Remained  
 at 97-98° until May 10<sup>th</sup> when 100° reached at  
 2 p.m. 101.8° at 6 p.m. Gradually fell to normal  
 at 6 a.m. on 11<sup>th</sup> May. 12<sup>th</sup> May at 10 p.m. rose to  
 100.8°. ~~Subnormal~~ 13<sup>th</sup> May 6 a.m. normal. at 10 p.m.  
 100°. 14<sup>th</sup> May 2 a.m. normal practically remained  
 so.

George Moore <sup>(24/13)</sup> :- admitted 25<sup>th</sup> apt (2nd day of disease)  
 Rash Generalized, bright. ~~Face~~ injected. Tongue  
 coated Glands Enlarged. 27<sup>th</sup> apt hiliaria, arms  
 and legs. 2<sup>nd</sup> May - Desquamation Trunk, arms,  
 and legs. Temperature On admission 25<sup>th</sup> apt at  
 2 p.m. 100.2°. at 6 p.m. 102.4°. fell to 100.4°  
 at 2 a.m. on 26<sup>th</sup> apt. rose to 102.6°. fell gradually  
 to normal at 10 a.m. on 28<sup>th</sup> apt; at 2 p.m.  
 rose to 99.4°, and 100° at 6 p.m. on 29<sup>th</sup> apt.  
 Normal at 6 p.m. on 30<sup>th</sup> apt and thereafter.



(act 19)  
Hestie Egan :-

Admitted 25<sup>th</sup> Apr (3<sup>rd</sup> day of disease)

Rash punctate, on limbs. Tongue "Strawberry"

Furrows & palate injected May 4<sup>th</sup> Grains desquamating  
 May 10<sup>th</sup> Cervical adenitis fairly well marked on left  
 side.

Temperature While in hospital practically  
 normal until 6 p.m. on 18<sup>th</sup> May when 99.4 recorded  
 fell to 99.2 on 6<sup>th</sup> <sup>the sharp pyrexia subsided</sup> at 2 p.m. on 10<sup>th</sup> May 102° (cerv  
 adenitis) May 11<sup>th</sup> washed normal.

~~then sharp pyrexia~~  
 May 12<sup>th</sup> 6 p.m. 101° May 14<sup>th</sup> 6 p.m.  
 100.2° May 15<sup>th</sup> - 99.6° at 6 p.m.

May 16<sup>th</sup> at 2 a.m.  
 normal & thereafter till 6 p.m. on 20<sup>th</sup> May when 101.4  
 recorded. Normal 6 a.m. on 21<sup>st</sup> May and thereafter.

(act 23)  
Amy Marshall :-

Admitted 25<sup>th</sup> Apr (3<sup>rd</sup> day of disease)

Rash. Generalized, coarse, punctate. Left <sup>deposits</sup> small patches of an

Furrows & palate injected, moderate oedema. Tongue coated.

Hands enlarged. Rhinorrhoea moderate, thin. May 4<sup>th</sup>

Desquamating. Sore & hands. June 4<sup>th</sup> Fainted 2<sup>nd</sup>

Yesterday - appears well. Temperature On admission

3<sup>rd</sup> day of disease 99°, at 10 p.m. 101.8°. Fell to

normal on 5<sup>th</sup> day & remained so.

(ad 9)  
Roe Bagery :- Admitted 28<sup>th</sup> Apr (2<sup>nd</sup> day of disease)  
 Rash Generalized, scarlet, punctate. Tongue coated.  
 Fauces injected. Some soft bacillar deposit.  
Submaxillary glands. Slight bilateral swelling.  
 29<sup>th</sup> May. Abreaction of both fauces. May 7<sup>th</sup> Deagumenting  
 neck, chest & soles. Temperature on admission.  
 2<sup>nd</sup> day of disease at 6 p.m. 103°. Reached normal  
 by crisis on May 1<sup>st</sup> & remained there.

(ad 10)  
Arthur Fender :- Admitted 30<sup>th</sup> Apr (3<sup>rd</sup> day of disease)  
 Rash Generalized scarlet punctate. Fauces injected  
Submaxillary glands. Slight bilateral swelling. 4<sup>th</sup> May  
 peeling face & trunk. Temperature. 100° on  
 admission at 6 p.m. on 30<sup>th</sup> Apr. May 1<sup>st</sup> at 2 a.m.  
 normal and thereafter.

(ad 11)  
Collins Wm :- Admitted 29<sup>th</sup> Apr (3<sup>rd</sup> day of disease)  
 Rash scarlet punctate most appearing lower abdomen  
 and thighs. Throat injected. Tongue slight  
 furrows, papillae prominent. May 5<sup>th</sup> Crisis  
 and scales peeling. Temperature. Normal  
 since admission.

(act 5 p. 1)  
Frank Hughes:- Admitted 21<sup>st</sup> apt (3<sup>rd</sup> day of disease)  
 Rash generalized, scarlet punctate. Tongue coated.  
 Fauces injected. Submaxillary glands. Slight  
 bilateral swelling. 22<sup>nd</sup> apt Some deposit on  
 tonsils. 23<sup>rd</sup> apt. Face peeling. 26<sup>th</sup> apt Small  
 abscess left buttock. 1<sup>st</sup> June Operations  
Temperature. On admn. 21<sup>st</sup> apt at 2 p.m.  
 101° at 6 p.m. 101.4°. 22<sup>nd</sup> apt. 6 a.m. 99°. 6 p.m. 99.6°. 23<sup>rd</sup> apt 6 a.m. Normal & remained  
 so.

(16 19/12)  
Margaret Fitzgibbon:- Admitted 20<sup>th</sup> apt (2<sup>nd</sup> day  
 of disease), Rash Generalized, scarlet punctate.  
 Tongue furred, papillae prominent. Fauces injected  
 21<sup>st</sup> apt Tonsils enlarged bearing white-punctate  
 secretion. Some faeces. 22<sup>nd</sup> apt Face desquamating.  
Temperature. On admn. at 6 p.m. on 20<sup>th</sup> apt 100°. 21<sup>st</sup> apt  
 Normal reached on 22<sup>nd</sup> apt.

(16)  
Dora Ramsdell:- Admitted 20<sup>th</sup> apt (5<sup>th</sup> day of disease)  
 Rash fading on trunk; Coarsely papular on legs. Fauces  
 injected. Left tonsil - some deposit. Tongue clean,  
 papillae prominent. 22<sup>nd</sup> apt. Scales desquamating.

Dora Hamden (Cont.) :- Temperature. 101° at 6 p.m.  
on 20<sup>th</sup> apt the day of admission. 21<sup>st</sup> apt. 6 a.m.  
normal. at 10 p.m. 99.4°. Thereafter normal.

Elyth House (10<sup>11/12</sup>) :- Admitted 15<sup>th</sup> apt (3<sup>rd</sup> day of disease).  
Rash generalized, scarlet, punctate. Tongue coated  
faintly injected. Submaxillary glands. Slight  
bilabial swelling. apt 22<sup>nd</sup>. Neck desquamating.  
Some rhinorrhoea. apt 24. Left cervical glands  
slightly enlarged. apt 27. Bilabial cervical glands.  
enlargement. Slight herpes labialis. apt 29. General  
desquamation. Temperature on 19<sup>th</sup> apt, the day  
of admission, at 6 p.m. 100°. 10 p.m. 102°. the  
highest recorded, oscillating, thereafter 101-99°.   
Remained normal from 23<sup>rd</sup> apt.

Mayon T. Fanning (at 5) :- Admitted 23<sup>rd</sup> apt (4<sup>th</sup> day of disease).  
Rash scarlet, punctate on trunk & thighs.  
Tongue coated papillae large. Faintly injected.  
Submaxillary glands - slight bilabial swelling.  
apt 25<sup>th</sup>. Pain in fingers (rheumatism) apt 26<sup>th</sup>.  
Extending to arms & wrists, 27<sup>th</sup> apt to shoulders.  
May 1<sup>st</sup>. 1<sup>st</sup> Cordis sound slightly rough.



Heary V. Sammis (cont'd) :- Reag 4<sup>th</sup> by 'friction'  
at left margin of Sternum level of nipple.

Temperature On adm 23<sup>rd</sup> Apr at 2 p.m. 101°  
slight remission of about a degree, then 102.8°  
at 6 p.m. on 24<sup>th</sup> Apr. Some oscillations. May 1<sup>st</sup>  
101.2 at 6 p.m. The readings got slightly lower -  
the lowest 99.8°. Normal 2 a.m. on May 2<sup>nd</sup>, at  
10 a.m. 99.8°. Thereafter practically normal readings  
leading to subnormal.

James Fark (219) admitted 23<sup>rd</sup> Apr (8<sup>th</sup> day of disease)  
Neck peeling. Tongue peeled, Papillae prominent.  
Fauces slightly injected. Submaxillary glands -  
slight bilateral swellings. Temperature No  
pyrexia in hospital.

Grace V. Long (214) admitted 24<sup>th</sup> Apr (3<sup>rd</sup> day of disease)  
Rare. Generalized, bright, coarse, punctate. Fauces  
deeply injected. Tongue coated. Glands enlarged.  
28<sup>th</sup> Apr Slight rhinorrhea, slight mental symptoms  
- wandering. 30<sup>th</sup> Apr. Superficial ulceration of  
Tongue - Stomatitis. May 1<sup>st</sup> Grad deepening. June 2<sup>nd</sup>  
Slight rhinorrhea. (cont'd).

Grace P. Long (Cont'd) :- Temperature an admission  
24th Apt 103°. fell gradually to 98.4 on 26th apt  
slight pyretic readings - maximum 99.8° till 6 p.m.  
on 1st May when fell to normal.

Annie Barnes <sup>(act 4)</sup> :- Admitted 24th Apt (4th day of  
disease) Rash Generalised, coarse. Pains of pharynx  
injected. Tongue "strawberry" Glands enlarged.  
Apt 25th Rash bright on limbs. May 1st General  
desquamation. Temperature an admission apt 24th  
at 2 p.m. 99.4°; rose to 100.2° at 6 p.m. fell to  
97.6° at 10 a.m. on 25th apt, no pyrexia followed.

Walter Baalman <sup>(act 4)</sup> :- admitted 26th Apt (4th day of disease)  
Rash faint, punctate, on trunk & limbs. Pains  
injected. Tongue coated papillae prominent.  
May 1st Hands desquamating. May 7th Vomited once.  
May 18th slight rhinorrhoea. Sore throat. Pains enlarged.  
Temperature normal on admission remained so.

Cecilia Ruth Sample <sup>(6/15)</sup> :- admitted 26th Apt (2nd day  
of disease) Rash Scarlet, punctiform. Tongue  
faint, papillae prominent, cleaning, antrons, papillae  
prominent. Throat injected some slight deposit  
on both tonsils. May 1st slight bilateral cervical  
swelling, left tonsil enlarged (Cont'd)

Cecilia R Sample (Cont'd): - May 11<sup>th</sup> Left Cervical  
admission May 18<sup>th</sup> Soles desquamating. Temperature  
On day of admission 26<sup>th</sup> Apr at 10 p.m. 101°. on 27<sup>th</sup> Apr  
at 10 a.m. 99°. at 10 p.m. 100.8°. Normal at 6 p.m.  
on 28<sup>th</sup> Apr & remained so.

Florus Lillian Ashley <sup>(at 6)</sup> :- admitted Apr 27<sup>th</sup> (3<sup>rd</sup> day  
of disease). Rash generalized scarlet. Tongue injected,  
furred, where clear brilliant red. Tonsils somewhat  
enlarged, slight deposit. May 4<sup>th</sup> Ear & nasal discharge.  
May 13<sup>th</sup> General desquamation. June 2 Croupy  
cough reported, not heard again. Temperature  
on admission 27<sup>th</sup> Apr 101°. Gradual fall to normal  
at 10 a.m. on 29<sup>th</sup> Apr, at 6 p.m. it had risen  
to 99.4°. at 10 p.m. normal again recorded, and  
continued so.

Rae Drove <sup>(14 1/2)</sup> :- admitted 30<sup>th</sup> Apr (3<sup>rd</sup> day of  
disease) Rash generalized, scarlet, punctiform  
tongue coated. Fauces injected. Tonsils. Slight  
deposit. Submaxillary glands slight bilateral  
swelling. May 7<sup>th</sup> Desquamation Right Sole

Rose Bruce (contin.) :- May 18<sup>th</sup> L. Cervical adenitis  
 June 5<sup>th</sup> Patient states she has sometimes expectorated  
 "phlegm streaked with blood". Yesterday "felt like it" but  
 swallowed it. Auscultation reveals an area small  
 in right supra-scapular region where Vocal Resonance  
 is increased and breathing of bronchial type.  
Temperature on 30<sup>th</sup> Apr - day of admission -  $100.0^{\circ}$  at  
 10 p.m. An irregular temperature followed, showing  
 remittence & intermitting until 11<sup>th</sup> day of disease.  
 Recurring on two occasions  $102^{\circ}$ . On 17<sup>th</sup> May  
 Temp. was  $100.2^{\circ}$  at 6 a.m.  $98.6^{\circ}$  at 2 p.m.  
 therefore normal.

(set 5)  
Kathleen Goodman :- Admitted 30<sup>th</sup> Apr (2<sup>nd</sup> day of disease)  
 Rash generalized, scarlet and purpuric. Tongue coated  
 Patches injected. Soft deposit on both Tonsils. Submaxillary  
 Glands slight bilateral swelling. Left Otorrhoea.  
 May 1<sup>st</sup> scattered petechiae amongst bright rash. (Cleft  
 palate) Tonsils ulcerated much mucoid deposit on  
 palate & pharynx. Hands cold & blue. May 3<sup>rd</sup> Tongue  
 raw with dark furring in parts. Bilateral cervical  
 cellulitis most marked on right side. Much mucous-purulent



Kathleen Goodman (Cont'd): - Swellings on fingers. Respiratory  
 murmur right base diminished. Creaking sounds less.  
 Dilatant & rumbling râles over chest. Glands red &  
 swollen. ~~May 5th~~ Distinct albumen. May 8th  
 black & general desquamation. May 11th Urinary  
 freckling. May 13th Breathing bronchial type  
 internal to lower angle of right Scapula with  
 approximation to such breathing at the corresponding  
 area of left side. Temperature On admission May 30th  
 101.4°, at 10 p.m. 102.8°. Patient hot & spayed  
 throughout since admission. Temperature kept high, 102.3  
 reached in spite of sponging, remissions owing to blisters  
 of 1-3°. May 4th lower records but sponging continued  
 101-99°. till May 5th when at 6 p.m. 102.6 was  
 indicated. 103.40. Voice recorded viz on 6th  
 17th May. Sponging remissions 9th-11th May. Lower readings  
 101.8° - 98.6°. Once after sponging (on 12th May) temp  
 recorded 103.2°. at 6 p.m. on 12th day 103°. On  
 13th May 6 a.m. 102.8°. Death at 12.5 p.m.  
 on 13th May 1903.

Gladys Brown (ad 4) Admitted 3<sup>rd</sup> May (3<sup>rd</sup> day of disease)  
 Rash greenish, scarlat. punctate. Tongue coated  
 Fauces injected. Submaxillary Glands - slight  
 bilateral swelling. May 4<sup>th</sup> Spots of deposit  
 on Tonsils. May 7<sup>th</sup> Face flushing.  
Temperature. On admission 3<sup>rd</sup> May at 4.15 p.m. 102.  
 4<sup>th</sup> May at 10 a.m. 100.6°. Rose to 102° at 10 p.m.  
 fell rapidly to 98° at 10 a.m. on May 5<sup>th</sup>.  
 Slight oscillations till 8<sup>th</sup> May - once reaching  
 100° at 2 a.m. on 8<sup>th</sup> May. Thereafter low  
 records, mean about 99.8°.

Ethel Hunt (ad 18) Admitted 2<sup>nd</sup> May (2<sup>nd</sup> day of disease)  
 Face flushed, Rash greenish, scarlat. punctate.  
 Tongue furred, beginning to peel. Throat injected  
 Tonsils enlarged. 6<sup>th</sup> May Right Shoulder painful  
 Cervical Glands - Bilateral enlargement. 8<sup>th</sup> May General  
 urticaria. Face desquamating. 9<sup>th</sup> May All but  
 Cervical swelling still marked. 10<sup>th</sup> May Right Earache  
 11<sup>th</sup> May Ulcerated Throat. Right Stomach. 14<sup>th</sup> May  
 Pustular Elevation. 16<sup>th</sup> May Sibilant Rales back of throat.

Ethel Hunt (Contd.) :- something like "friction" about  
 1" below & medial to left nipple. Some diminution  
 of R.M. & K.R. near inferior angle of left Scapula.  
 20<sup>th</sup> May Vomited once last night & this morning. Pulse  
 rapid, some regurgitation on taking milk. 21<sup>st</sup> May  
 Pulse rapid. Right Ear projects. Swelling over right  
 mastoid. Left Otitis media. Fluctuation (?) present  
 no pus. Faint trace of albumen. 23<sup>rd</sup> May  
 Temperature normal. 25<sup>th</sup> May Pulse irregular  
 26<sup>th</sup> May Vomited once yesterday & again this morning.  
 Left subclavicular region resonance impaired, protraction  
 of expiration, feet a little inhibited. 27<sup>th</sup> May  
 Vomited last night (from egg?) 29<sup>th</sup> May  
 Pulse rapid but regular. 30<sup>th</sup> May Looking better.  
 3<sup>rd</sup> June Probed wound, large area of bare bone.  
 7<sup>th</sup> June Albumen has persisted. Temperature  
 Quaden 2<sup>nd</sup> May at 2 p.m. 107°. at 10 p.m. 102°. Remitting  
 up to 18<sup>th</sup> May - 103.8° receded at 6 p.m. on 14<sup>th</sup> May -  
 the range being about 2°. 20<sup>th</sup> May 102.6° Continued  
 to oscillate reaching lower records. 26<sup>th</sup> May Normal  
 and remained practically so till 7<sup>th</sup> June.

(Oct 8)  
Sidney Seymour:- Admitted 4<sup>th</sup> May (3<sup>rd</sup> day of disease)  
 Rash Generalized, punctate; on arms & chest a  
 pruriginoid condition. Tongue furred, papillae  
 prominent. Throat injected. Parotids deposit  
 7<sup>th</sup> May Parotids & Mucous ulcerations. 9<sup>th</sup> May  
 neck swelling. Temperature Quads 4<sup>th</sup> May  
 at 10 p.m. 100°. 5<sup>th</sup> May at 10 a.m. 102.8°. Gradual  
 fall to ~~98°~~ 98° at 10 a.m. on 7<sup>th</sup> May  
 slight oscillations, 100° highest up to 2 a.m. on 10<sup>th</sup>  
 May then normal records.

Harold Jackson M  
 Oct 1903.



## A Note on Tracheotomy in Scarlet Fever

Tracheotomy in Scarlet Fever for obstruction of the fauces and upper respiratory tract is not by any means of frequent occurrence. However in the practice of Fever Hospitals it occasionally happens that a case of profound faucial type is admitted where tracheotomy is the only rational treatment indicated. Very slight allusion is made in the text book to this contingency - at least in those consulted by the writer. viz Clifford Allbutt, Allchin, Osler &c. Twice it fell to the writer's lot to perform tracheotomy in Scarlet Fever. In each case the patient was a male, aged two years. The following is an abbreviated history of the two cases:-

S.S. (male) age 2 years was admitted to the Brook Fever Hospital, Shooter's Hill S.E. on 2<sup>nd</sup> Dec 1903 with a generalized punctate rash & dark tint. Patient had previously suffered from 'tramp' (1 year ago) and 'measles'. The rash had been first noticed on 25<sup>th</sup> Feb on the back and <sup>was</sup> accompanied by sore throat. On 26<sup>th</sup> & 27<sup>th</sup> Feb patient vomited. On 1<sup>st</sup> March nasal discharge developed. On admission, 2<sup>nd</sup> Dec (3<sup>rd</sup> day of disease) patient showed a generalized punctate rash & dark tint. Pulse very rapid; at 6 p.m. it numbered 164. With respirations 62 per minute. Temp 101° which continued to rise. Tongue furred with papillae prominent at margins. Throat very tumid and bled readily. There was a profuse rhinorrhoea. No cardiac murmur detected on auscultation. Nasal & faucial cultivation were taken but subsequent bacteriological examination failed to detect Klebs-Loeffler Bacilli. 3<sup>rd</sup> Dec (6<sup>th</sup> day of disease) Rash fading. Temp. at 10 a.m. 101°, it had receded 102.5° at 6 a.m. Patient had spent a restless night. Râles were noted at base behind and over front of chest.

The faucial obstruction was very great the patient making violent suffocative efforts at respiration. As tracheotomy appeared to be the only treatment indicated by the condition, it was done at 5 p.m. with immediate disappearance of dyspnea.

4th Mar (7th day of disease). Patient reported to have been wakeful until 3 a.m. when he slept. Rash was still discernible. Air entrance good. Sibilant, with a few moist râles heard in front and back of chest. Pulse was rapid - 148 - and feeble. The cardiac area had not increased as revealed by percussion. During the night patient grew worse and the temperature which at 10 p.m. recorded  $103.8^{\circ}$  necessitated frequent hot sponging. Patient died at 8.15 p.m.

At the Post Mortem Examination on 6th Mar, no signs of pneumonia were detected. The trachea were much excoriated by ulceration. The Epiglottis bore a wash-leather-like membrane (a culture showed no Klebs-Loeffler or Bacilli). The larynx was congested and the lower part of trachea contained some thick mucopurulent secretion. The mitral valve was somewhat thickened and there appeared to be rather more pericardial fluid than normal present. The kidneys were congested.

Treatment. The patient was fed rectally with peptinized milk to which brandy was added. The throat was syringed with chlorinated soda solution four hourly and the fauces were painted with Iodo-Purpurator. Et. Glycerin. a a. On 4th Mar Dig. Mycin., in 10 drops, was administered hypodermically every 4 hours. Hot sponging was done when the temp. recorded  $101^{\circ}$ .  
Tracheotomy at 5 p.m. on 5th Mar 1903, 6th day of disease (as previously recorded).

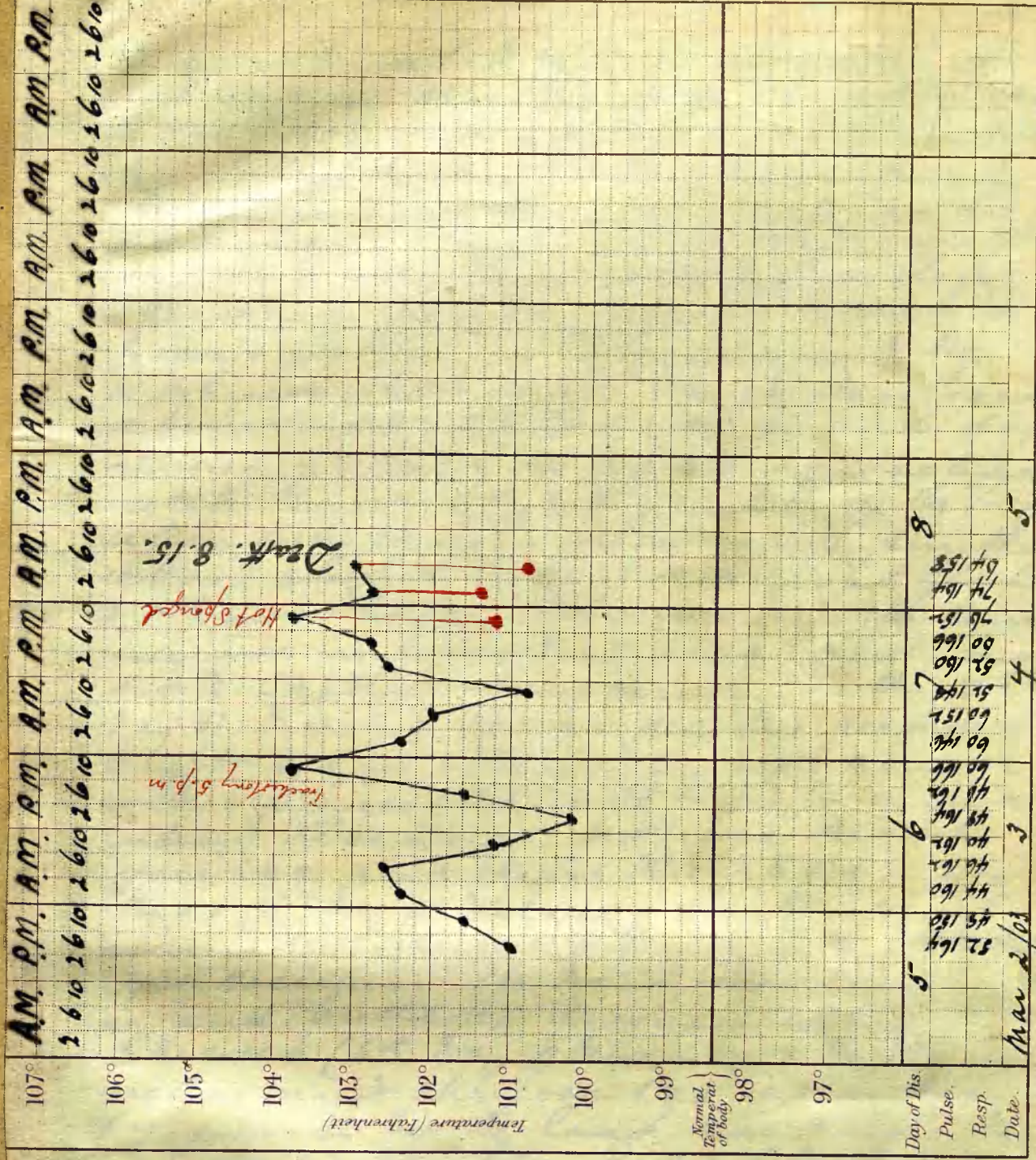


Name { *J. S.*  
 Age *2 years*  
 Diet  
 Case Book No

Notes of Case

Date of admission  
*5th Mar 1903*

Result



Entered at Stationers Hall

Printed and Published by Widdows & Co. 6, Gate Street, Lincoln's Inn.

General Clinical Chart



A.C.A. male, age 2 years admitted to  
the Brook Hospital Shooter's Hill S.E. at 3.50 p.m.  
on 9th Mar 1903 with a generalized punctate  
rash. Patient during history had suffered  
from Bronchitis and since then had had  
Right Otorrhoea. Present illness began on 7th  
March with sore throat and swelling  
of the cervical glands. On 8th March a  
rash was noticed on the arms and legs  
and rhinorrhoea and cough developed.  
On admission - 9th Mar /03, the third day  
of disease, patient exhibited a generalized  
punctate rash, slight furrow of the tongue,  
injection of the fauces with mucus-purulent  
secretion, slightly enlarged cervical glands  
and rhinorrhoea. There was no evidence  
of increase in precordial area and no  
audible cardiac murmur. On 10th Mar.  
(4th day of disease) the temperature recorded  
99.6 at 10 a.m. The fauces were much  
swollen associated with profuse mucus-  
purulent discharge, profuse thick  
rhinorrhoea and Right Otorrhoea. On  
11th Mar (5th day of disease) Bacteriological  
Examination showed absence of the Klebs-  
Loeffler Bacillus. The rash was fading, the  
face and buttocks desquamating.  
12th March (6th day of disease) the faucial  
secretions and rhinorrhoea have been  
very profuse for the last two days. The  
fauces are ulcerated. Right Otorrhoea ceased.  
At 10 a.m. the pulse recorded 134 beats with  
Respirations 26 per minute. Temperature  
100.2 which rose rapidly 103° being reached  
at 2 p.m. and was treated with hot Sponging.  
Bilateral swelling of cervical glands. 13th Mar  
(7th day of disease) no improvement detected.  
No extension to Bronchial Tubes or Lungs as  
revealed by auscultation. Pulse 142  
Respirations 28. Heart sounds pure.  
Rhinorrhoea noticed to be more profuse  
thin and watery. High temperature ruled  
but was checked by systematic hot Sponging.  
14th March 1903 (8th day of disease) A slough  
came away from fauces this morning.  
15th Mar (9th day of disease) Pulse rapid 148  
per min. at 10 a.m. Respirations 28 per min.  
Temperature in spite of Sponging keeps up. Nasal



discharge less. 16<sup>th</sup> Mar. (10<sup>th</sup> day of disease) Pulse maintained its rapidity. Sances very dirty and bleed readily. Rhinorrhea very profuse. 17<sup>th</sup> Mar. Temperature 103.4° at 10 p.m. yesterday used 101.4° (is sponged). Pulse feeble and tending to become more rapid, not irregular. Sances very dirty, much mucus - purulent secretion and bleed readily. Sonorous Rhonchi heard over front and lower half of back of chest.

18<sup>th</sup> Mar. (11<sup>th</sup> day of disease, Temperature necessitates frequent hot sponging. Sances perhaps a little cleaner. Rhinorrhea less. Syphic Rash on forearms noticed yesterday. Bacteriological Examination reveals (no Klebs. Löffler Bacilli. 19<sup>th</sup> Mar.

(12<sup>th</sup> day of disease), Arms and legs twitch during sleep. Prolongation of Respiration heard at both bases behind with Rhonchi. No apparent Cardiac enlargement. 20<sup>th</sup> Mar. (14<sup>th</sup> day of disease) Temperature keeps up, the mean during last 24 hours about 102° in spite of hot sponging. Patient passed a better night. Pulse very rapid. Patient reported to be a bad colourer sometime after sponging. Moist râles heard about left mid-scapular region. Faint Sibilant Rhonchi at right base behind. Rhinorrhea less but more profuse discharge which is thick and mucus-purulent. At 3.15 p.m. the breathing became bad and Tracheotomy was performed, a No 3 Tube being used. This was followed by immediate subsidence of dyspnea, at 10.45 p.m. the air entrance was good and the Chest resonant to percussion. No râles were heard on auscultation.

The pulse was very rapid sometimes uncountable. There was some slight extension of the Cardiac dulness towards the left. The tube was changed at 12 midnight.

21<sup>st</sup> Mar. (15<sup>th</sup> day of disease) Slept at intervals during night. At 4. a.m. dyspnea for half an hour. Examination of the Chest revealed diminished Respiratory murmur with moist râles distributed over the Chest and some recession.

Diarrhea commenced. Colour, which on the whole kept good during the night.

now getting bad. Very restless. Pulse practically uncountable. Patient died at 2.20 p. m.

The Post Mortem examination showed ulceration of the Tonsils and a sloughing condition of Larynx and Trachea. The Right Bronchus was injected. No pneumonia process was detected. There was some thickening of the mitral valve. The liver was congested. The Gall Bladder was distended and there was some bile coloured staining of the Omentum. The kidneys were congested.

Treatment. The patient was fed by the mouth and rectally, with progressively increasing quantities of brandy being used. On 11th day of disease yolk of Egg was added to the diet. During the course of the illness various applications to the throat were tried including Carbolic acid. A mixture containing Spirit. Ammon. arom. was given; and Dry Cupping hypodermically in the later stages. A piece of thin gauze moistened with Ol. Eucalypt. was kept over the <sup>external</sup> orifice of the Tracheostomy Tube after operation on 20th March 1903.

In so far as Bacteriological examination has been there cases were of uncomplicated Scarlet Fever, and it is reasonable to conclude that at any time a practitioner may be confronted with similar cases of such profound type that he may have to decide between the performing of Tracheostomy and the certain and rapid death of the patient. It may be urged that cases of such severe character will go on to a fatal issue even though the trachea be opened. But although such an eventuality is more than probable, the prognosis admittedly being eminently unpavourable - especially in cases of such early age as the two recorded - yet instances have occurred in fever hospitals where Tracheostomy in Scarlet Fever has certainly saved life. In the writer's opinion Tracheostomy, if only

as a palliative, should also be performed in Scale's Trachea where the dyspnea is clearly of the obstructive type, even though the organic process be of the severest kind. The agonizing efforts at respiration are all the distressing to patient and attendants - although in the case of the patient no doubt the toxic condition largely modifies the apparent anguish. Again there is a chance - possibly a remote one - but still a chance that the vitality of the patient will be capable of coping with the disease when not compromised by the ~~anesthetic~~ imposition of respiratory obstruction. Certain it is that death will ensue unless something radical be done. Obviously tracheotomy cannot in any way intensify the risks to the patient.

In the cases where the wife's interest, it was after deliberating with colleagues experienced in laryngeal work, who while recognizing that the prognosis was distinctly unfavorable, yet considered that the best treatment indicated was that of tracheotomy.

Both cases proved fatal. But recovery could scarcely be expected in patients suffering from such a profound type of disease, whose age fell within the first quinquennium of life. But in the wife's opinion the marked respiratory relief, which followed the operation in both cases, alone completely justified the method of treatment.

J. Gordon D. M.D.  
Oct. 1903.

(over)



Name A.C.A.

Age 2 years

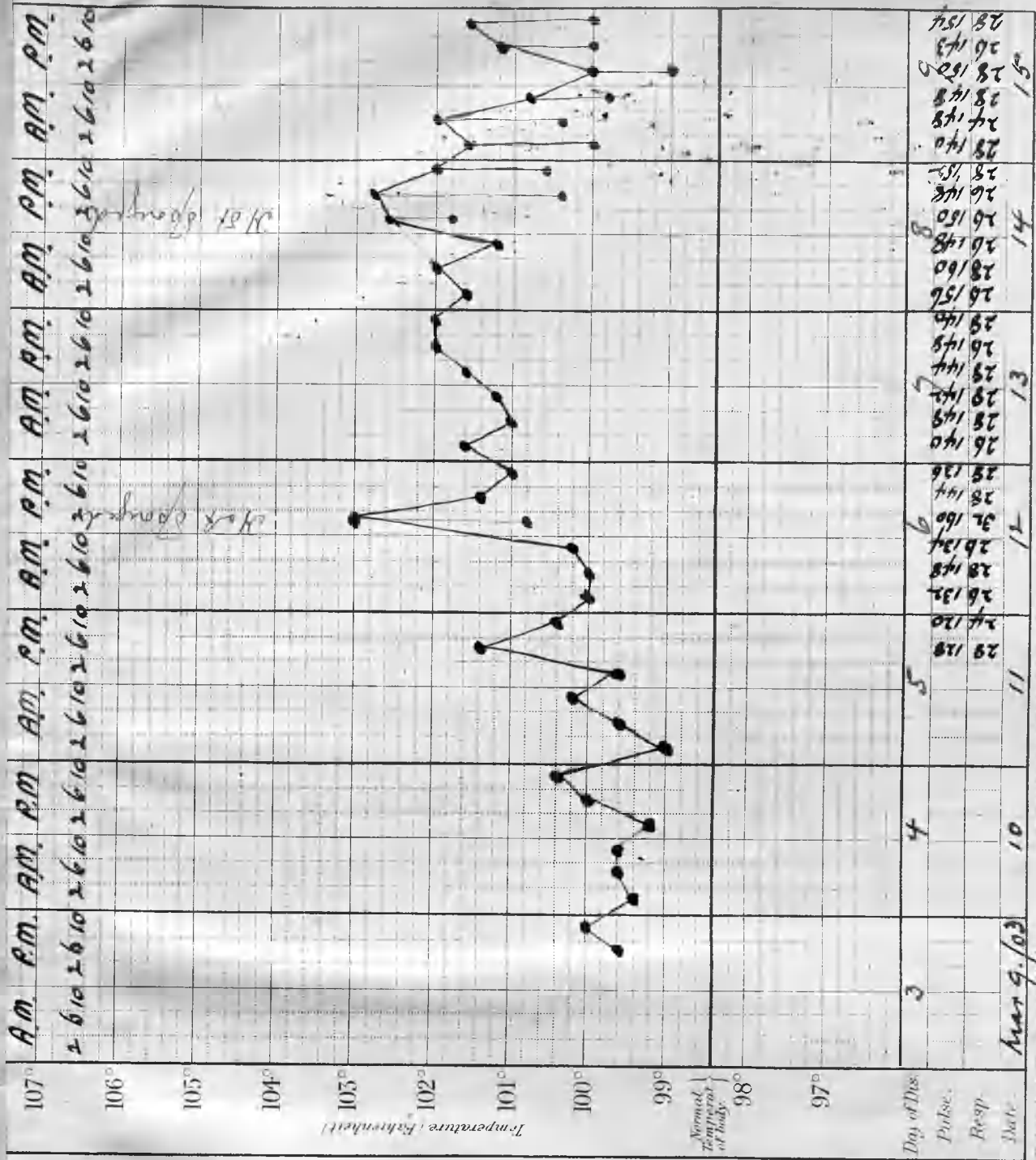
Diet

Case Book No.

Notes of Case

Date of admission  
29 Mar 1903

Result





No.	act.	Day	WBC	Count	Diff. Count	Polymorpho- nuclears	Eosinophils	Neutrophils	Large Lymphocytes	Mononuclear Lymphocytes	Eosinophils Myelocytes
1	Fred Barnes	7 1/2	Apr 16	6	7.700		70	1.8	.6	2.0	
2	.	24	14	17.000	500:-	89.4	6.2				
3	.	May 1	21	14.700							
4	.	11	31	10.500							
5	Albert Hart	6	Apr 16	6	32.600	500:-	96.8	1.6	.2	1.4	
6	.	23	13	23.800							
7	.	30	20	16.600							
8	.	May 6	26	13.300	500:-	91.0	5.6	.2	1.2	2.0	
9	Wm. D. Siggett	5	Apr 23	3	18.700	500:-	98.8	1.0		.2	
10	.	30	10	17.800							
11	.	May 6	16	11.600							
12	.	13	23	8.100	150:-	95.3	2.6			2.0	
13	Las. M. Carther	15 1/2	Apr 23	2	14.500	500:-	98.4	1.0		.6	
14	.	30	9	17.300							
15	.	May 7	16	9.300							
16	.	13	22	14.700	300:-	79.3	.6	4.3	2.3	13.3	
17	Fred Baker	14	Apr 24	4	15.300	500:-	89.6	4.4	2.0	4.0	
18	.	May 1	11	16.400							
19	.	7	17	22.900							
20	.	15	25	13.900	300:-	92.0	2.0			6.0	
21	Geo. Moore	13	Apr 25	2	5.100	500:-	97.2	1.6	.8	.4	
22	.	May 2	9	10.700							
23	.	11	18	13.600	300:-	88.0	4.2	1.0		6.6	
24	.	18	25	11.100							
25	Kestie Egan	8	Apr 27	5	19.100	300:-	94.0	3.3		.3	2.3
26	.	May 2	10	11.500	500:-	85.6	1.6	6.8	3.8	2.2	
27	.	11	19	11.900	300:-	98.6	.3	.3		.6	
28	.	18	26	12.400							
29	Amy Haskell	23	Apr 29	7	6.900						
30	.	May 8	16	8.000							
31	.	15	23	11.800	300:-	91.0	4.0			5.0	
32	.	18	26	6.800							
33	Rose Barger	9	Apr 29	3	18.800						
34	.	May 8	12	13.300							
35	.	15	19	9.600							
36	.	19	23	6.100							
37	Arthur Fisher	10	May 1	4	8.200						
38	.	7	10	11.800							
39	.	13	16	17.400							
40	.	20	23	16.000							
41	Wm. Collins	5	May 1	5	10.600	500:-	73.0	8.8	7.8	5.4	5.0
42	.	7	11	19.800							
43	.	13	17	15.100	500:-	91.4	4.6	.2	.6	3.2	
44	.	20	24	14.100							
45	Frank Hughes	5 1/2	Apr 22	4	28.900	300:-	95.0	3.6		1.3	
46	Wm. J. Gibbons	6 1/2	22	5	12.400	300:-	94.0	5.6	.3		
47	Dora Rueden	16	22	7	16.000						
48	Elijah Moore	10 1/2	23	7	32.500						
49	Marion V. Fanning	8	23	4	28.600	500	96.4	2.2		1.4	
50	James Carter	9	24	9	19.100	500	95.2	3.8	.6	.4	
51	Grace E. Long	4	24	3	18.000	500	95.6	4.0	.2	.2	
52	Annie Barnes	4	25	5	27.400	500	95.0	4.2		.2	.4
53	Walter Boston	4	25	5	17.200	500	85.0	1.8	10.0	3.0	.2
54	Cecilia R. Simple	6 1/2	27	3	10.500	500	83.2	15.8		.4	.6
55	Flo. L. Brantley	6	29	5	12.200						
56	Rae Drenow	14 1/2	May 1	4	16.700	500	96.2	1.2	1.2	1.4	
57	Kathleen Goodman	5	1	3	22.000						
58	Gladys Dixon	5	4	4	13.200	500	97.2	1.4	.4	1.0	
59	Edna Hunt	5	6	7	16.200	500	88.6	3.2	2.2	4.8	1.2
60	Sidney Seymour	8	7	10	14.300						

Red Blood Corps. 605,000 per Cub. m. met. Haemoglobin 70 % (Hug)